

Digital vs Analogue Television

Digital television was launched in Australia in 2000 and the uptake by the general public has been slowly increasing. Many people ask what the differences are and “what’s in it for me”. This tech tip will look at digital television from the user’s point of view, rather than dwell extensively on the technology itself.

What is transmitted?

Since the advent of digital television, Australia has had a “triple-casting” policy. As well as maintaining the traditional PAL analogue colour television signal, commercial broadcasters transmit digital signals in both standard-definition (SD – 576 active lines, same as PAL) and high-definition (HD) versions. The number of lines in HD is not legislated, but the majority of networks use 1080 line signals for their HD transmissions. The audio with SD is stereo, while HD has 5.1 surround-sound audio associated with it.

While the commercial networks are (so far) prohibited from transmitting entire separate services, the rule does not apply to the government broadcasters. The ABC currently has a second service, ABC2, which is available only via digital.

There has been some experimentation in the past with “multi-casting”, where the broadcaster uses additional digital services to transmit a different version of the same event. These have typically been sports, where the additional services might include statistics, or a version of the coverage without commentary.

What are the advantages?

The most noticeable advantage of standard-definition digital is that it is widescreen. In mathematical terms, it has an aspect ratio (width:height) of 16:9 instead of the 4:3 of PAL. Because all material is acquired on 16:9 cameras, it means you see more of the picture. A good example is cricket coverage, where the view down the pitch might include an extra slip fieldsman.

Because the transmission technology for digital is different, it also eliminates a problem sometimes seen with PAL called “ghosting”. Ghosting typically occurs in locations without a “line of sight” path to the transmitter, or near to reflective objects like large buildings. It is caused by multiple versions (primary path plus reflections) of the signal arriving at the antenna via different paths and therefore at different times and shows up on-screen as a “ghost” of the image appearing to the right – or possibly even more than one. The transmission technique used in digital eliminates ghosting completely.

High-definition reception offers additional richness. As well as being widescreen, HD televisions offer more detail in both the horizontal and vertical, by virtue of having more picture elements, known as pixels. Typical HD displays today have 1366 x 768 pixels, which compares to 720 x 576 for standard definition. Full HD resolution sets with 1920 x 1080 pixels have also recently been introduced. Audio for HD is also enhanced, with full 5.1 channel surround-sound. The “.1” refers to low-frequency effects, which are delivered by a special speaker called a sub-woofer. It makes the floor shake for explosions in action movies (for example) and adds extra “pit of the stomach” impact to rock music.

What do I need to get digital?

While some later-model televisions include digital tuners, the more common way of receiving a digital television signal is via a settop box. These connect to the television via standard A/V connections – component is preferred for analogue signals into the display, although newer settop boxes and televisions may include direct digital interfaces, such as HDMI (high definition media interface) or DVI (digital video interface). If you are buying new equipment, check to see if the television of your choice includes a digital interface – if so, make sure the settop box provides a compatible digital output.

With audio, you have a choice – you can connect the audio directly to the television speakers if you choose, but many people prefer to run it directly into their stereo as an auxiliary input. If you have an HD settop box which will receive the 5.1 channel audio, it will typically be run into a home theatre sound system to distribute the channels to the full range of speakers.

One aspect of the settop box interfacing to the television via A/V connections is that the television’s analogue tuner can still be used – for example, to provide access to community television channels which are not transmitted digitally.

Do I need to buy a new TV?

No. The output from a digital settop box can be displayed on a conventional, 4:3 aspect ratio TV set, but there are advantages to a widescreen display. If you want to see the whole digital picture, without cropping and without distortion, then it needs to be “letterboxed”. It is shrunk in size vertically, so that its width fits into the screen width of the television. This means that you will have black areas on screen above and below the picture, with the corresponding loss of resolution in the vertical – fewer lines are being used to show the picture. It is similar to the effect of playing a widescreen program off DVD to a 4:3 television.

In fact, being able to play DVD's full-screen with the proper aspect ratio is the reason many people are looking at widescreen televisions to begin with – and full-screen display of digital television is for them just an added bonus.

Does digital television have any drawbacks?

There are a couple of negative aspects about digital television reception. One is that in marginal reception areas, it may not work at all, or at least not in bad weather. If you are in a marginal area, you may need to upgrade your antenna system to be able to receive digital consistently.

Digital television “breaks” differently to analogue. As the received signal level for analogue drops, the picture will start to display noise – often referred to as “snow” – and the sound may get a bit noisy. But if you are willing to put up with a quality below optimal, you will still have a watchable product. Digital is different. It tends to be either very good, or really bad – audio drop-outs, picture breakup, or even a black screen.

Another issue with digital is less dramatic, but still noticeable. Digital reception is susceptible to a type of electrical noise called impulse noise. As the name suggests, it is a narrow spike of noise associated with an electrical transient, such as turning lights on or off. It can cause a short disruption to some aspect of signal reception. Most common is a loss of audio for half a second or so. Occasionally there may be a “pop” in the audio, or in extreme cases a portion of the picture may get blocky for about a second, or the picture may freeze momentarily.

Summary

While digital television may be unsuitable in areas of marginal reception, for those with reception, it provides a number of advantages:

- ✓ Widescreen format gives you more picture
- ✓ Eliminates ghosting
- ✓ One more channel: ABC2

High definition (HD) digital also gives you these advantages, plus:

- ✓ More detailed, lifelike pictures
- ✓ 5.1 surround-sound audio